

Odontogenic Infections

Objectives

- Provide general information on odontogenic infections and their potential origin based on fascial space involvement.
- Provide general information on the diagnosis and treatment of maxillofacial infections.

Odontogenic Infections

- One of the most difficult problems
- Range from low-grade to severe, life-threatening
- Most are easily managed with minor surgery and antibiotics

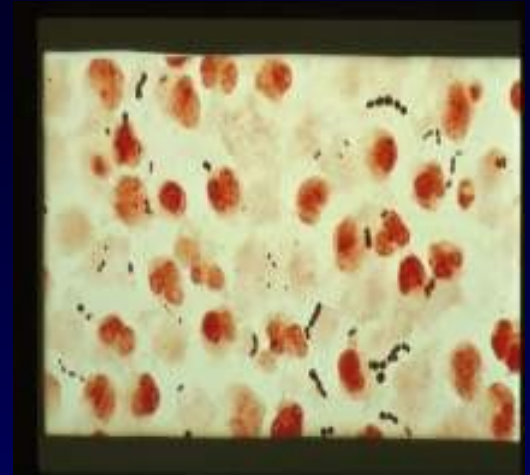


Odontogenic Infections

- Systematic approach to Infection Patient
 - Typical Microbiology
 - Natural history of odontogenic infections
 - Principles of infection management
 - Indications for referral to OMS



Microbiology

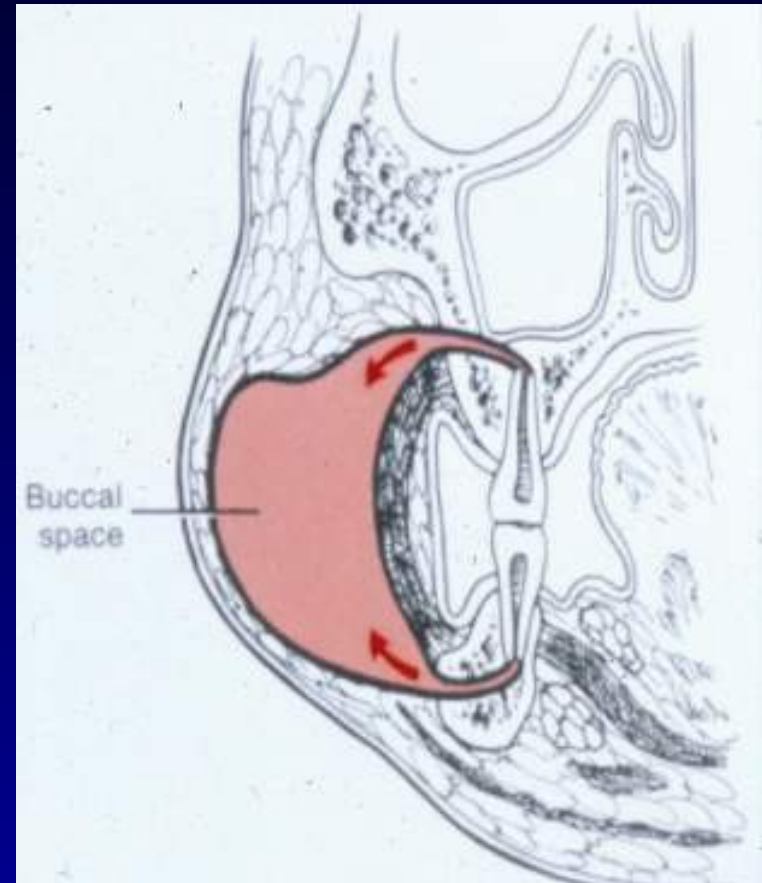
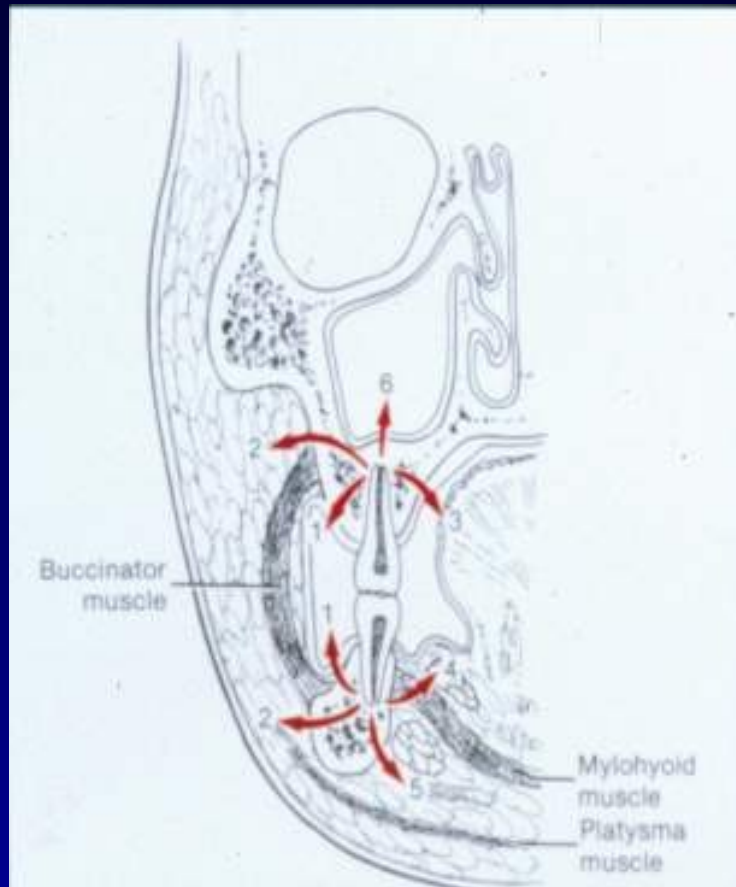


- Indigenous bacteria
 - Normal oral flora
- Polymicrobial
- Aerobic-anaerobic composition
 - Aerobic gram + cocci (Streptococci)
 - Anaerobic gram + cocci (Strep, Peptostrep, Pepto), gram + rods (Eubac, Lacto), and gram - rods (Porphyromonas or Prevotella, Fusobacterium)

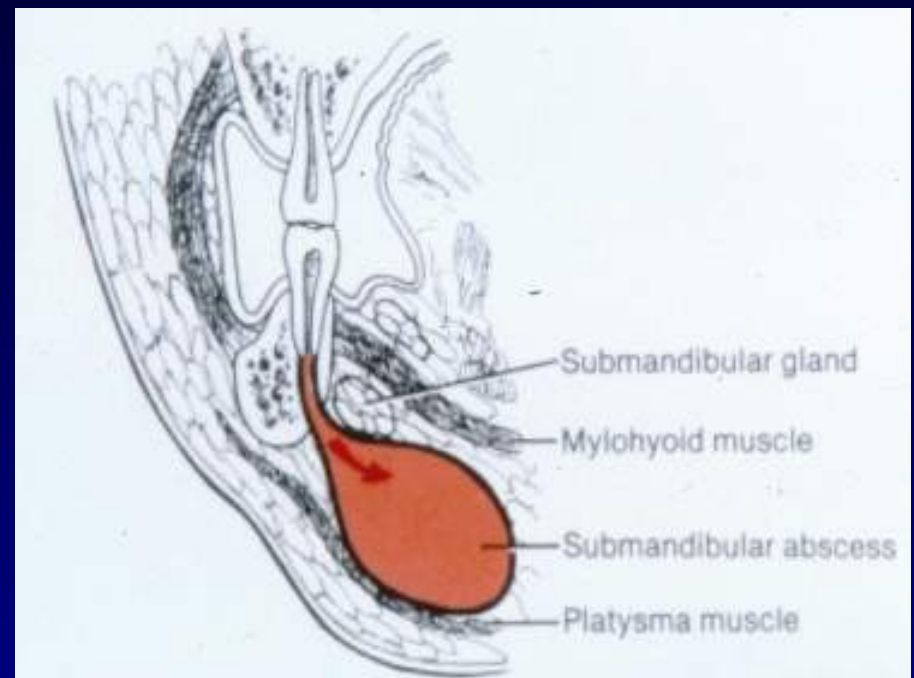
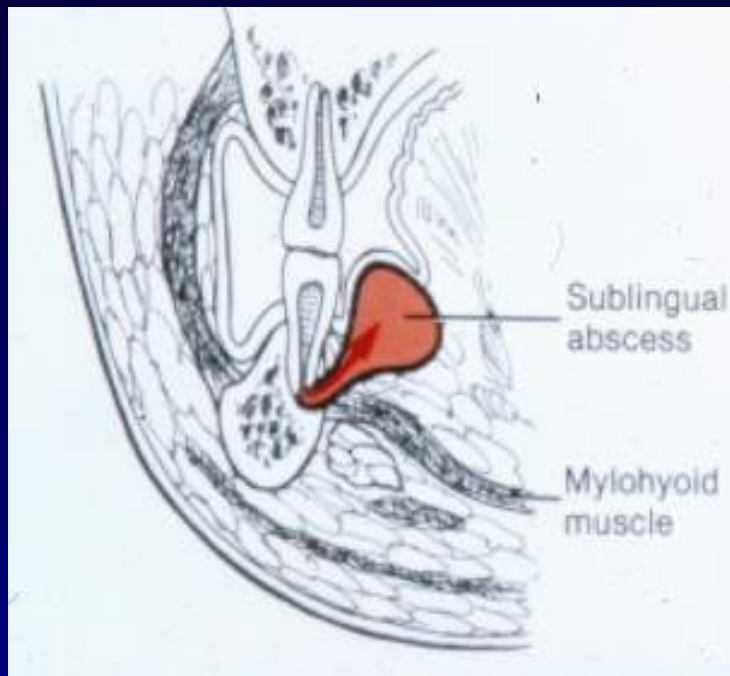
Progression of Odontogenic Infections

- Periapical
- Periodontal
- Soft tissue involvement
 - Determined by perforation of the cortical bone in relation to the muscle attachments
- Cellulitis- acute, painful, diffuse borders
- Abscess- chronic, localized pain, fluctuant, well circumscribed.

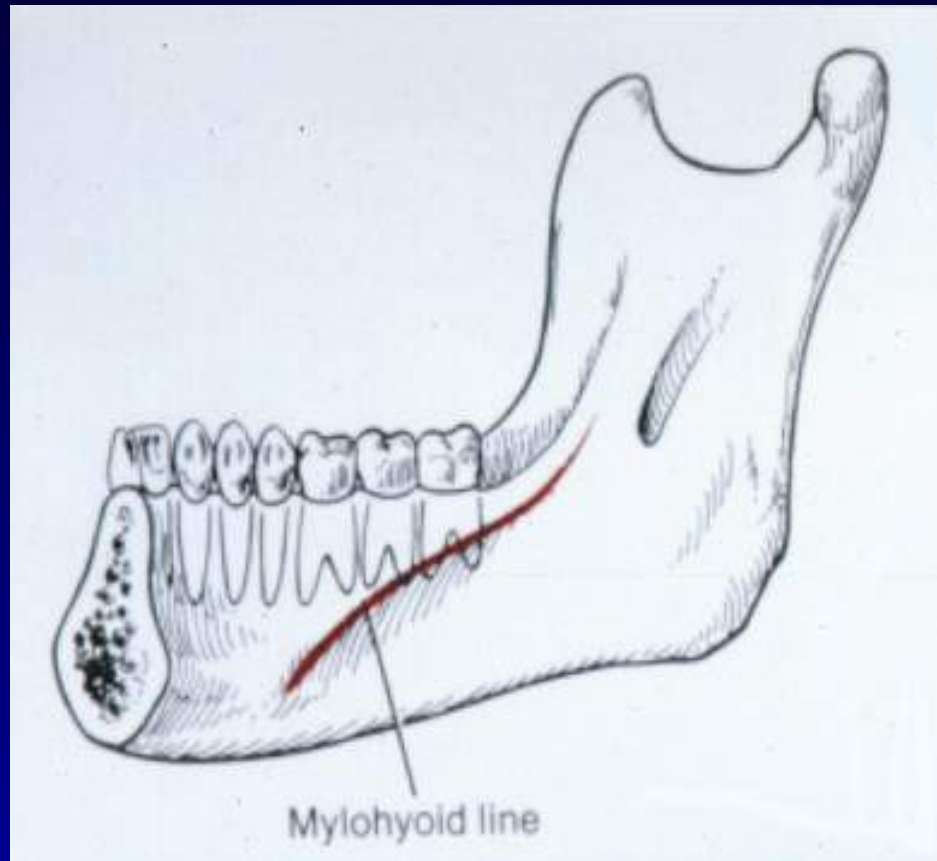
Progression of Odontogenic Infections



Progression of Odontogenic Infections



Progression of Odontogenic Infections



Principles of Treatment

- Determine the severity of the infection
- Complete history
- Physical examination
- State of the patients host defense
- Treat the infection surgically



Principles of Treatment

- Support the patient medically
- Choose and Rx the appropriate AB
- Re-evaluate the patient frequently
- Referral to OMS?



Severity of the Infection

- Complete History
 - Chief Complaint
 - Onset
 - Duration
 - Symptoms



Severity of the Infection

- How the patient feels- Malaise
- Previous treatment
- Self treatment
- Past Medical History



Physical Examination

- Vital Signs
 - Temperature- systemic involvement >101 F
 - Blood Pressure- mild elevation
 - Pulse- >100
 - Increased Respiratory Rate- normal 14-16



Physical Examination

- General appearance
- Palpate the area of swelling
 - Indurated- firm, hard
 - Fluctuant- fluid filled
 - Doughy- normal
- Intra-oral exam

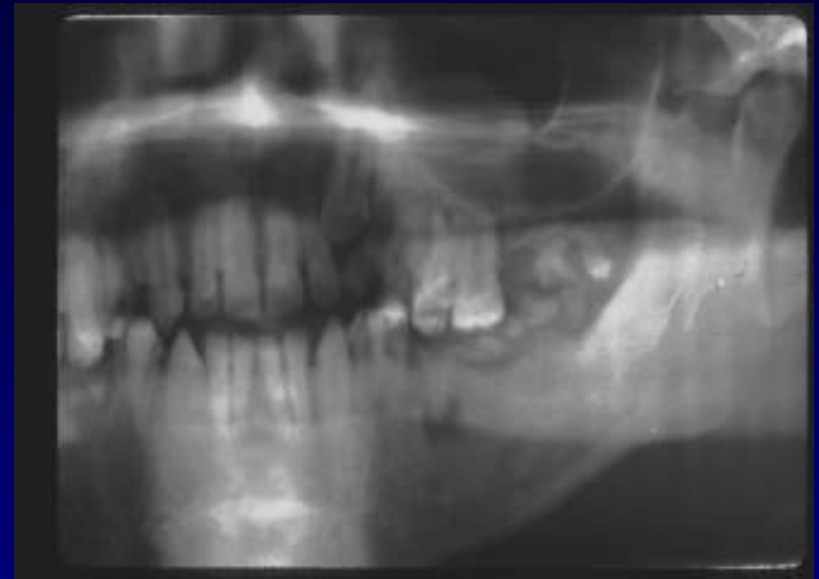


Intraoral Exam

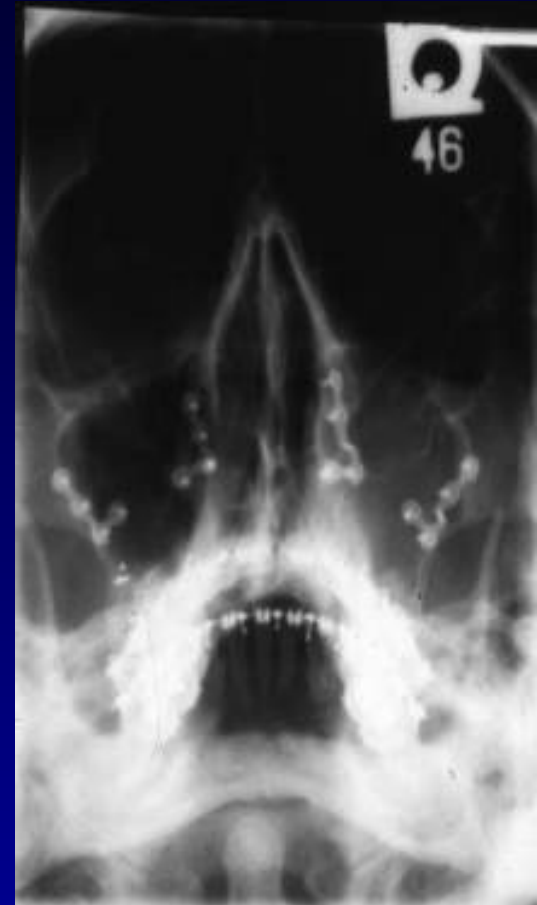


Radiographic Examination

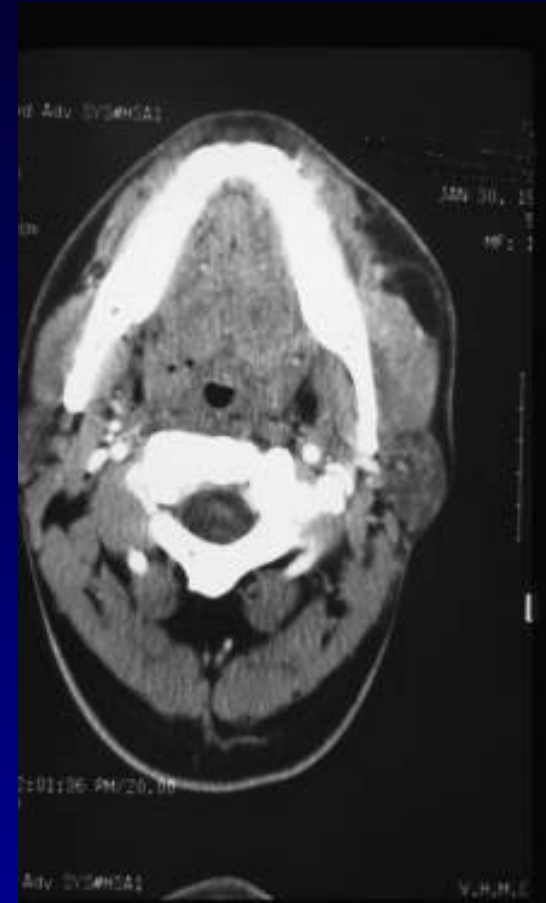
- Panorex
- Plain Films
- CT
- MRI



Radiographic Examination-Plain Films



Radiographic Examination- CT



Host Defense Mechanisms

- Local defenses
 - Intact anatomic barrier
 - Indigenous bacteria
- Humoral defenses
 - Immunoglobulins
 - Complement
- Cellular defenses
 - Phagocytes
 - Lymphocytes



Medically Compromised Patients

- Uncontrolled metabolic diseases
 - Alcoholism
 - Malnutrition
 - Diabetes
- Suppressing diseases
 - Leukemia
 - Lymphoma
 - Malignant Tumors



Medically Compromised Patients

- Suppressing drugs
 - Chemotherapeutic agents
 - Immunosuppressives



Indications for Referral to OMS

- Rapidly progressing infection
- Difficulty in breathing
- Difficulty swallowing
- Fascial space involvement



Indications for Referral

- Elevated Temperature >101 F
- Severe trismus
- Toxic appearance
- Compromised host defenses



Signs of Inflammation

- Dolor- Pain
- Tumor- Swelling
- Calor- Warmth
- Rubor- Redness
- Loss of function
 - Trismus
 - Difficulty in breathing, swallowing, chewing



Surgical Treatment

- Provide drainage
- Remove the cause of infection
 - Pulpectomy
 - Extraction
 - Remove foreign body
 - Debride non-viable bone
- Culture and sensitivity



Surgical Treatment

- Incision and drainage
 - Dependent site
 - Incision in healthy tissue
 - Adequate drainage
 - Exploration of all involved spaces
 - Irrigation



Surgical Treatment



Indications for Culture and Sensitivity Testing

- Rapidly spreading infection
- Post-op infection
- Non-responsive infection
- Recurrent infection
- Compromised host defenses



Microbiologic Considerations

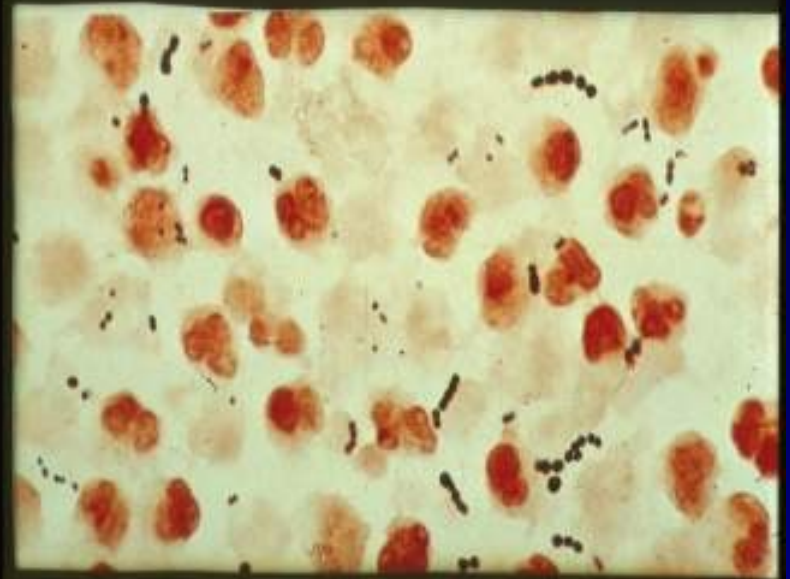
- Identification of bacteria
 - Representative specimen collected
 - Examine specimen
 - Submit for culture and sensitivity
 - Gram Stain



Culture and Sensitivity

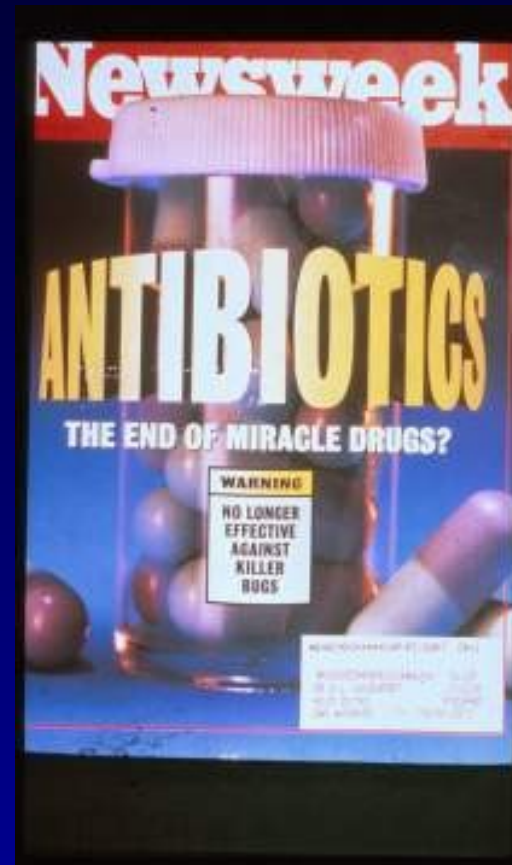


Gram Stain



Choosing the Appropriate Antibiotic

- Is an antibiotic necessary?
- Indications:
 - Acute onset infection
 - Diffuse swelling
 - Compromised host defenses
 - Involvement of fascial spaces
 - Severe pericoronitis



Principles of Antibiotic Therapy

- Use Empiric Therapy
- Use narrowest spectrum drug
- Use antibiotic with the lowest toxicity
- Use bactericidal antibiotic
- Be aware of Cost \$\$\$



Principles of Antibiotic Therapy

- Administer the antibiotic properly
- Proper route of administration
- Proper dose
- Proper time interval
- Adequate period of administration

Empiric Antibiotic Therapy

Drug	Indication	Route of Administration
Pen V	Mild-moderate infection	PO
Pen G	Moderate-severe infection	IV
E-mycin	Mild infection- +Pen allergy	PO
Cefadroxil (Duricef)	Mild-moderate infection +Pen allergy, depressed host	PO
Cefazolin (Ancef)	Moderate-severe infection +Pen allergy, depressed host	IV
Clindamycin	Chronic infection-anaerobes*	PO
Metronidazole (Flagyl)	Serious infection- inpatient Combination with Pen G	IV
Augmentin	Sinus- odontogenic origin Dog and human bites	PO
Septra + Metronidazole Vancomycin Cipro + Metronidazole	Serious infection with severe allergy to Pen (anaphylaxis) Inpatient-IV	

* Serious infection Clindamycin not as good against strep, use Pen + Metronidazole.

Antibiotic Cost Comparison

<u>Drug</u>	<u>Dose</u>	<u>Cost for 10 days</u>
■ Pen VK	QID	\$1.20
■ E-mycin	QID	\$3.20
■ Keflex	QID	\$4.00
■ Duricef	BID	\$37.80
■ Cipro	BID	\$34.20

Antibiotic Compliance

- Dosage interval that encourages compliance
 - QD or BID 70%
 - QID 40%
- Non-compliant after start feeling better
 - 3-5 days 50%
 - >7 days 20%

Support Patient Medically

- Fluids
- Nutrition
- Analgesics
- Consider need for insulin



Patient Monitoring

- Re-evaluate the patient frequently
- Response to treatment
 - Temperature
 - Swelling
 - How do you feel?
- Need for additional imaging?



Patient Monitoring



Development of an adverse reaction?



Antibiotic Associated Colitis

■ Diagnosis

- Profuse watery diarrhea >10 per day
- Cramping
- Fever
- C. difficile culture and toxin assay
- Tissue culture

■ Treatment

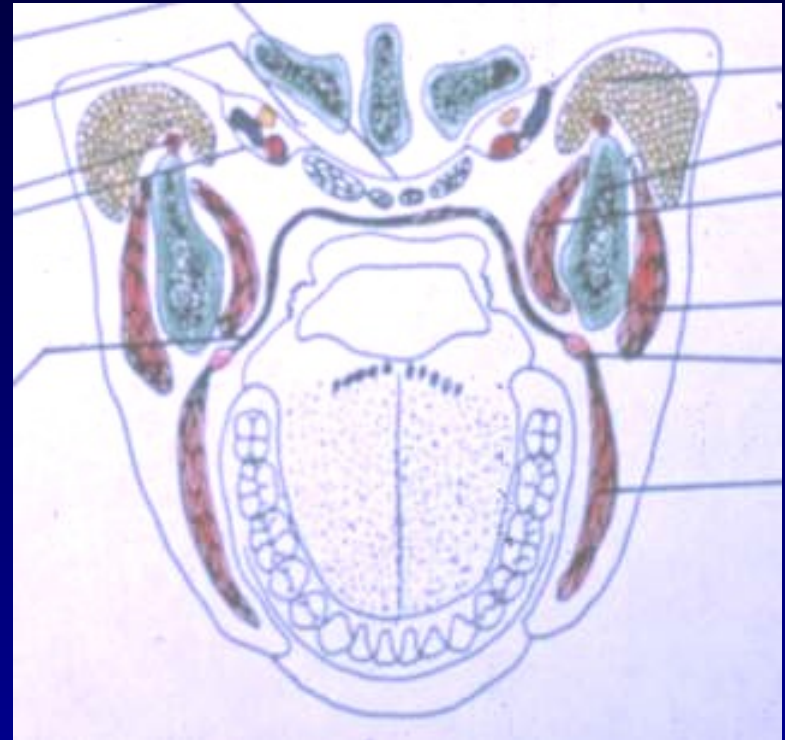
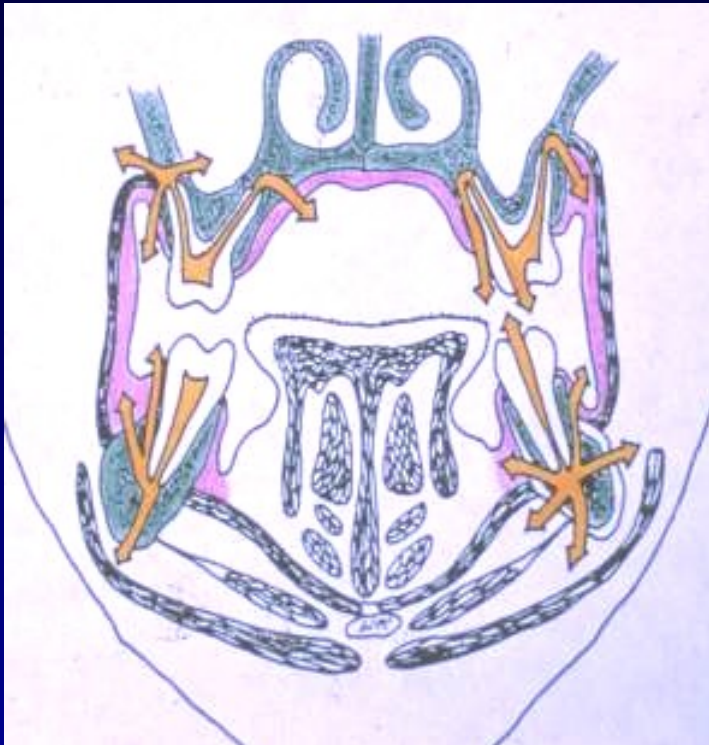
- D/C current AB
- Fluid management
- Antibiotics
 - » Metronidazole
 - » Vancomycin PO

Reasons for Treatment Failure

- Inadequate Surgery
- Depressed host responses
- Foreign body
- Antibiotic problems
 - Patient noncompliance
 - Drug not reaching the site
 - Drug dose too low
 - Wrong antibiotic



Fascial Space Infections

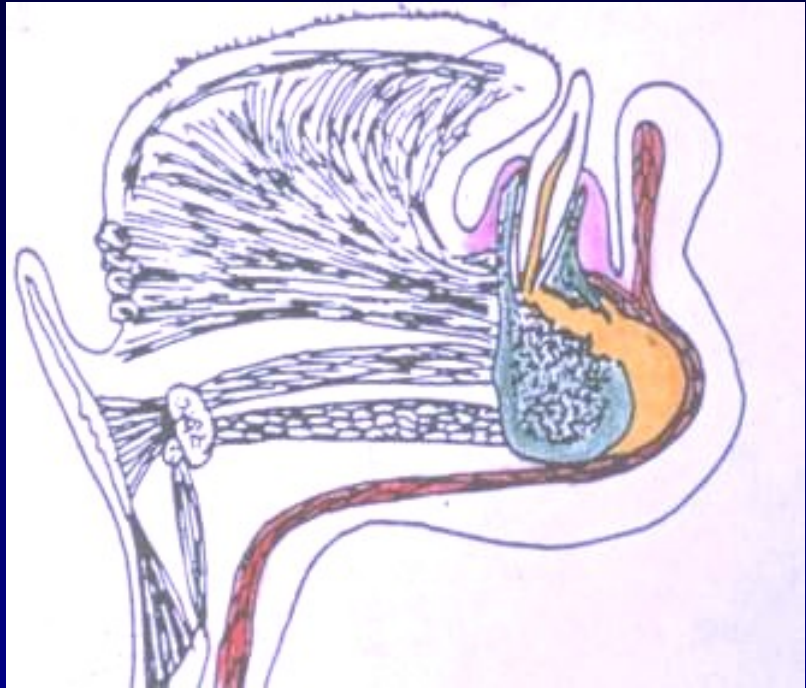


Mandibular Odontogenic Infections

- Sublingual space
- Submental space
- Submandibular space
- Masticator space
- Lateral pharyngeal space
- Retropharyngeal space



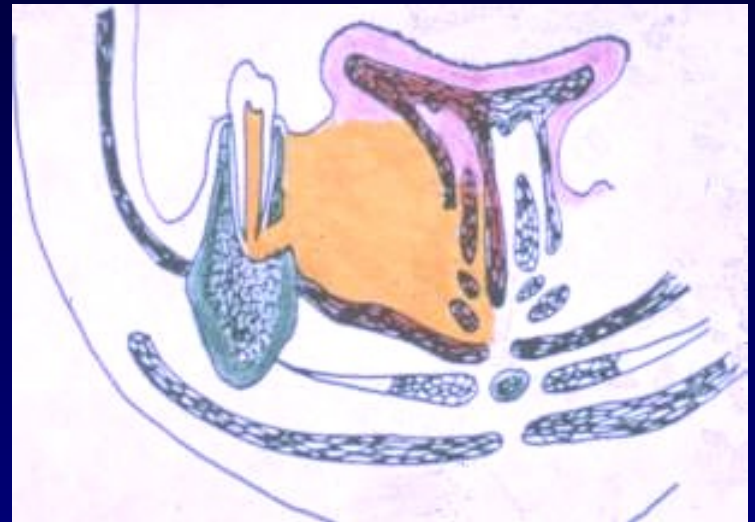
Submental Space Infection



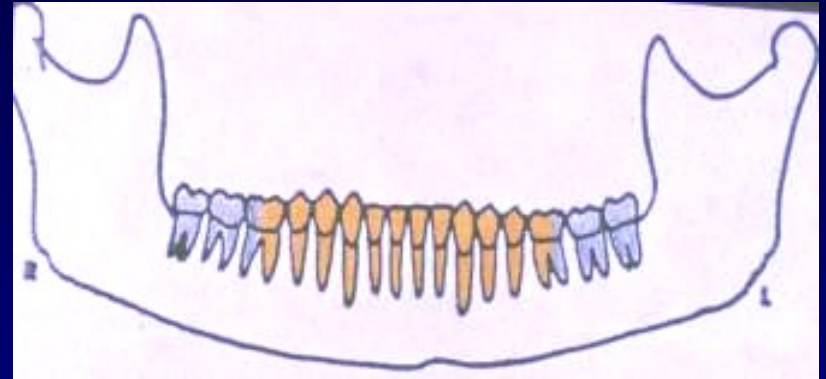
Submental Space Infection



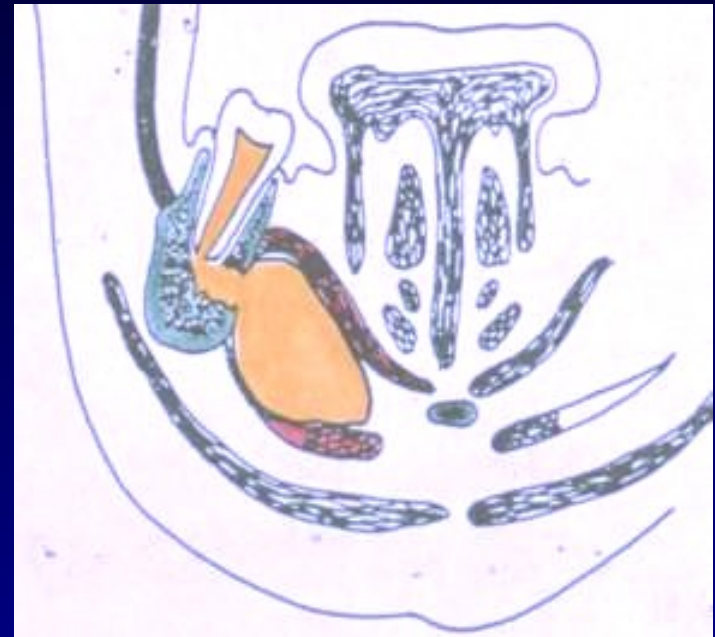
Sublingual Space Infection



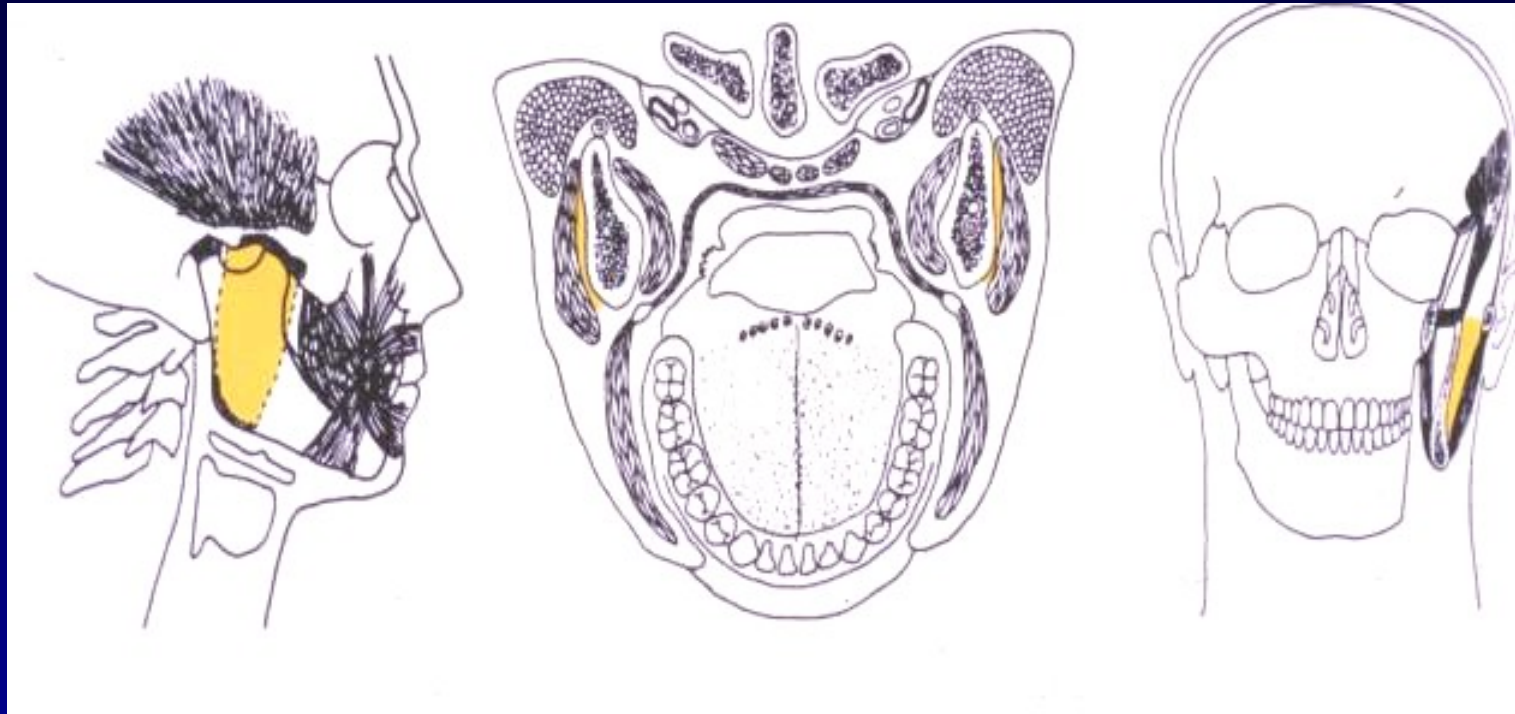
Sublingual Space Infection



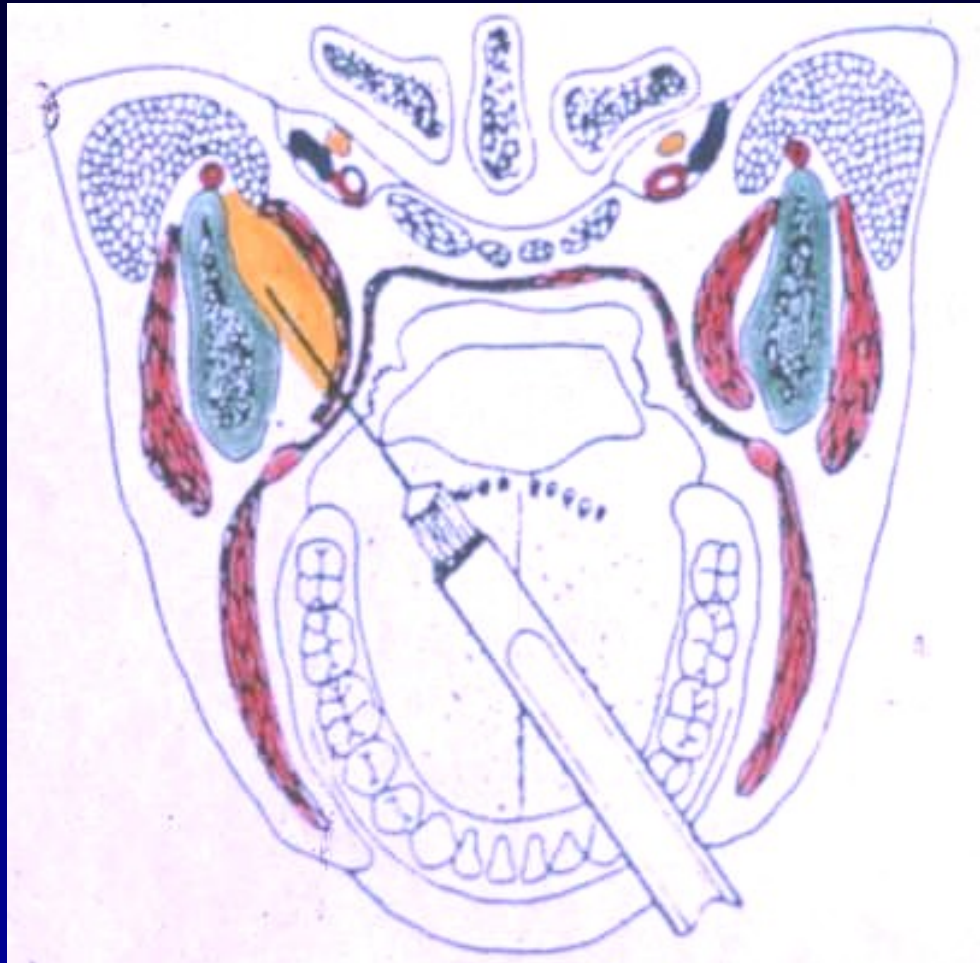
Submandibular Space Infection



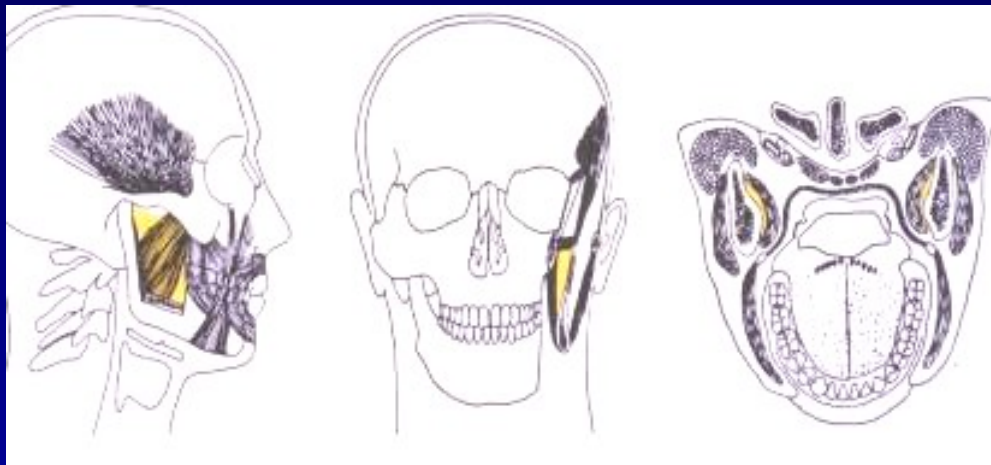
Masticator Space Infection



Masticator Space Infection



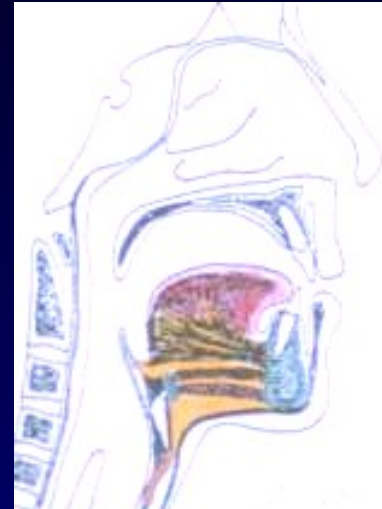
Lateral Pharyngeal Space



Retropharyngeal Space

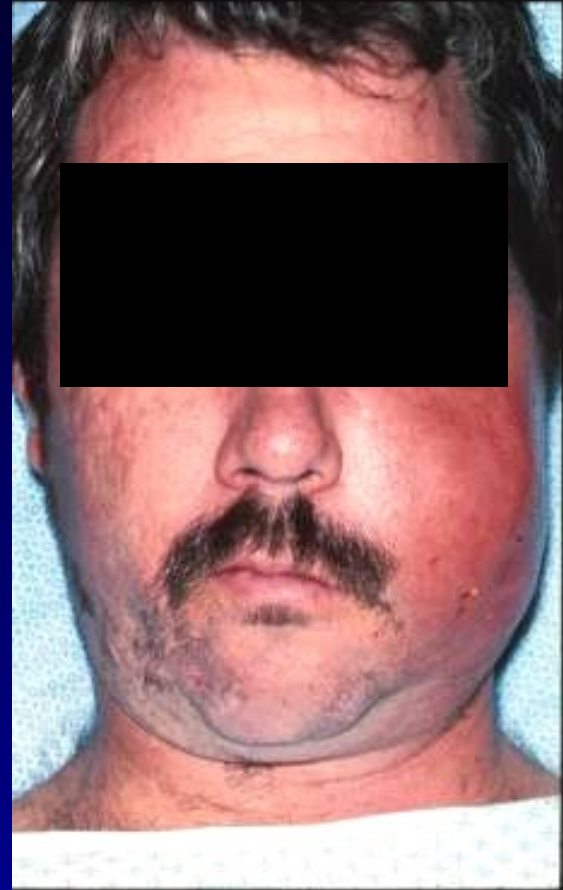


Ludwig's Angina

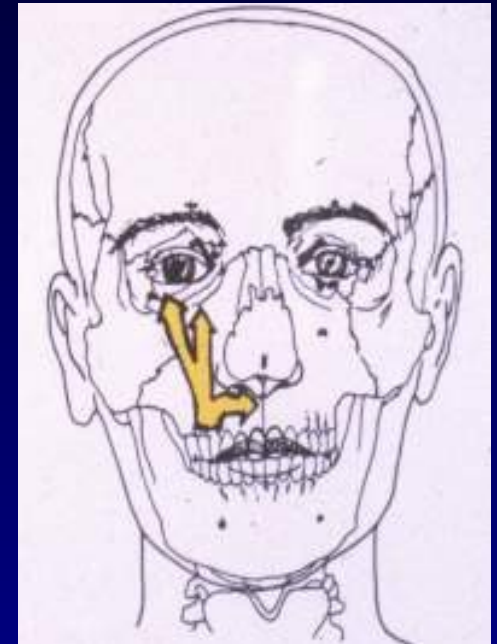


Maxillary Odontogenic Infections

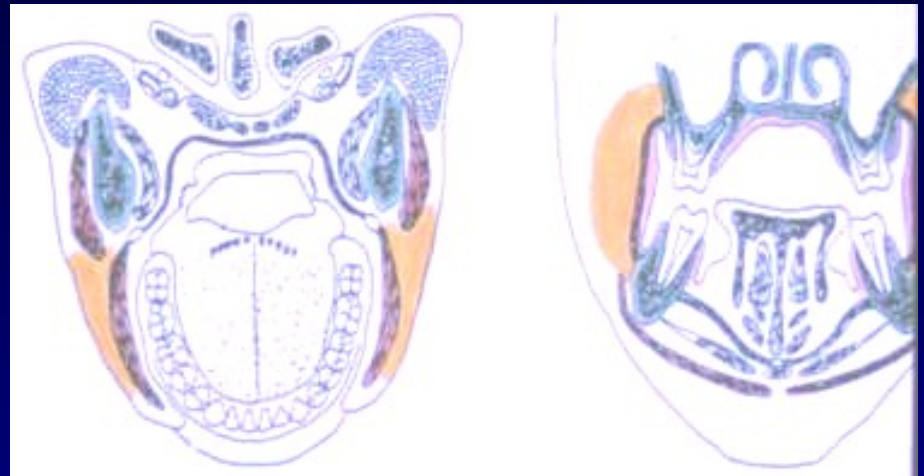
- Canine space
- Infratemporal space
- Temporal space
- Buccal space



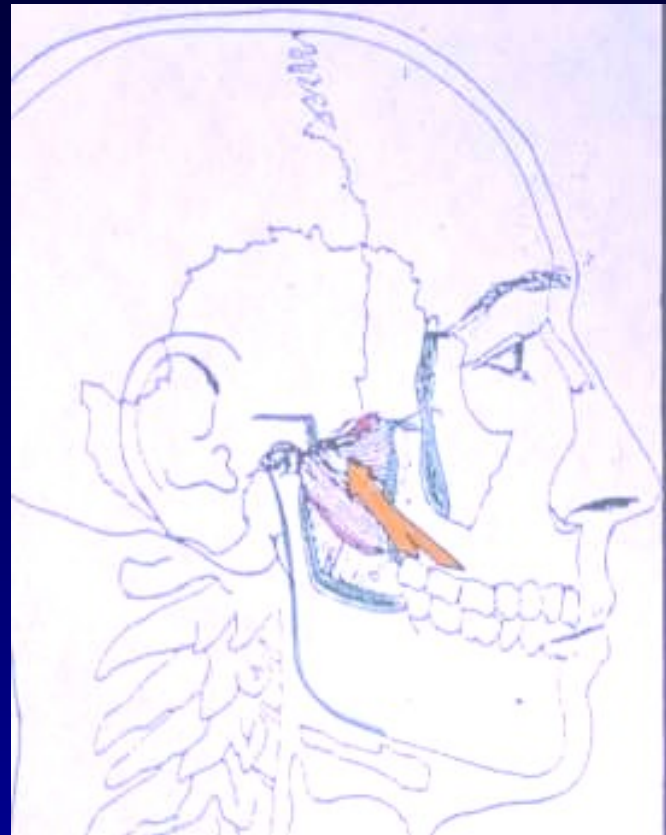
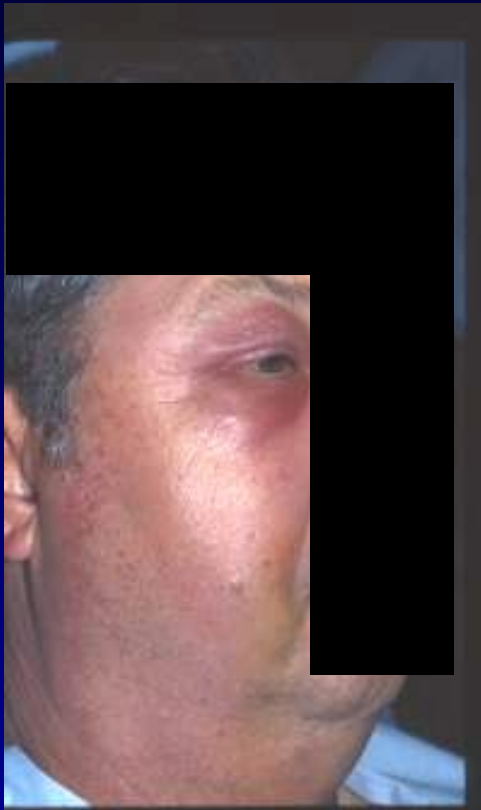
Canine Space Infection



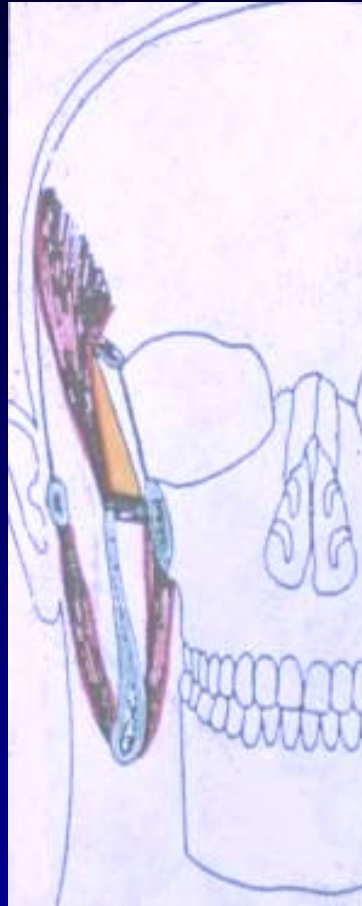
Buccal Space Infection



Temporal Space Infection



Temporal Space Infection

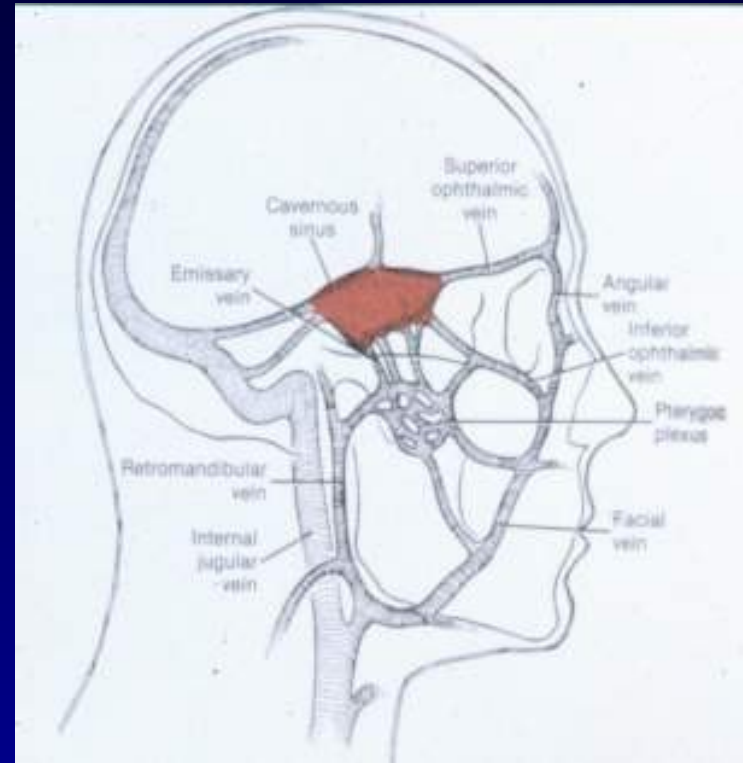


Head and Neck Infections

- Peritonsillar abscess
- Acute orbital cellulitis
- Cavernous sinus thrombosis
- Meningitis
- Necrotizing fascitis



Acute Orbital Cellulitis



Treatment of Odontogenic Infections

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- Complete history
- Physical examination
- State of the patients host defense
- Treat the infection surgically
- Support the patient medically
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- Referral to OMS?

References/Additional Resources

- Topazian RG, Goldbert MH, Hupp JR, Oral and Maxillofacial Infections, 4th Edition, Philadelphia, WB Saunders: 2002.
- Fonseca RJ, Walker RV, Betts NJ, *Oral and Maxillofacial Trauma Vol 1 & 2*, 3rd Edition. Philadelphia: WB Saunders, 2005.
- Miloro M, Ghali GE, Larsen PE, Waite P, Peterson S. *Principles of Oral and Maxillofacial Surgery Vol 1 & 2*. Ontario: BC Decker Inc, 2004.